The present invention relates to actuators and caps for valveable aerosol dispensers and more particularly to a combination latch assembly and safetying tie assembly for actuators whereby sampling and inadvertent dispensing of the dispenser contents is prevented.

In the field dealing with the construction of actuators and caps for valveable aerosol dispensers, it has been the general practice to employ a finger actuator which is mounted on a dispenser cap which in turn is fastened to a container having a product under pressure therein.

Although such devices have served the purpose, they have not proved satisfactory under all conditions of service for the reason that these devices heretofore have been susceptible to facile disengagement thereby permitting undetected sampling of the dispenser's contents. Also these devices have been subject to inadvertent actuation during shipment and handling.

The general purpose of the present invention is to provide an actuator and cap for valveable aerosol dispensers which embraces all of the advantages of similarly employed actuators and possesses none of the fore-described disadvantages. To attain this, the present invention utilizes a unique latch assembly and safetying tie which assures that the contents of a dispenser remain intact against tampering and normal handling. Seizing of the tie provides an indication that the contents of the dispenser have been susceptible to discharge.

An object of the present invention is the provision of a novel locking device which assures that the discharging mechanism of a dispenser is not actuated until the actuating device has been disengaged.

Another object is to provide a safetying tie which prevents an upwardly disengaging latch from becoming disengaged when subjected to normal handling and shipping operations or unusual and improper handling.

Further object of the invention is the provision of a tamper-indicating device which provides an indication when the contents of a dispenser have been susceptible to sampling.

Still another object is to provide an actuator latch assembly which permits easy engagement and disengagement of the latching members.

In the present invention these purposes (as well as others apparent herein) are achieved generally by providing a locking actuator construction of aerosol dispensers having a radially-extending discharge spout port. This discharge spout has a downwardly-operative finger actuator part having a thin, bendable cross-section portion, a nozzle outlet part, and latch means including a latching tab extending from the finger actuator part and terminating in a notch designed to receive a latch seat. A cap part houses the discharge spout part and has an aperture through which the nozzle part projects, another aperture through which said finger actuator part projects, and a tab-engaging part on said cap for securing the latching tab. A safetying tie characterized by a tough, resilient T-shaped thong having an elongated portion attached to the finger actuator part extends to and terminates in an enlarged end. This enlarged end is secured within a safetying slot provided in the cap part, the width of the safetying slot being chosen intermediate that of the narrow end and the enlarged end of the safetying tie.

Utilization of the invention will become apparent to those skilled in the art from the disclosures made in the following description of a preferred embodiment of the invention as illustrated in the accompanying drawings, in which:

FIG. 1 is a cross-sectional view of the two-piece, locking actuator construction mounted upon a pressurized dispenser container and engaging a resiliently mounted valve stem thereof; the finger operable portion being shown latched against downward movement as well as secured against upward movement.

FIG. 2 is a plan view of the locking actuator construction shown removed from the container with the finger actuator portion latched against downward movement and the safetying tie extending therefrom in its unobstructed condition.

FIG. 3 is a cross-sectional view of the locking actuator construction of FIG. 2 with the finger actuator portion unlatched and the safetying tie extending therefrom in its unobstructed condition, the dashed lines representing an assembly step executed prior to the mounting of the actuator construction upon the container.

FIG. 4 is a view from the bottom of the locking actuator construction shown in FIG. 3; and

FIG. 5 is a rear view of the locking actuator construction of FIG. 2.

Referring now to the drawings, wherein like reference characters designate like or corresponding parts throughout the several views, there is shown in FIG. 1 a metal dispenser container a having an annular recess b at its mouth and a metal mounting bead c bearing a resilient grommet-like seal d which mounts a hollow-stemmed valve e. The hollow-stemmed valve e terminates at one end in an enlarged diameter head f which is tightly forced against the grommet-like seal c by the pressure in container a. The hollow-stemmed valve e also have valve stem ports g positioned near the head end of the tubular stem and a flared discharge tip g at its other end. These parts have been known heretofore.

One of the two separate parts or members of the locking actuator construction is the stationary cap member 11, which may be molded of any one of the more attractive plastics commercially available and advantageously of one of the harder plastics such as polyethylene, which yields a fine finish. The stationary cap member 11 includes the form of a circumferential wall 12 which extends vertically upward from a base portion 17 to a flat horizontally-extending intermediate top portion 19. This top portion 19 mounts a discharge spout housing member 18 which is of general arrowhead configuration in its plan view. The spout housing member 18 has a tapering and downwardly-sloping top portion 21 which extends from a front opening 31 of the spout housing member 18 to a rear opening 33 thereof. Two side walls 23 diverge rearwardly from the opening 31 to meet in a rear wall 27 which extends upwardly from the base 17 and tangential to the circumferential wall 15. These side walls extend downward from the tapering and sloping edges of the top portion 21 to terminate in the intermediate top portion 19.

The cap member 11 has undercut protrusions 29 formed integrally therewith and in close proximity to the base portion 17 whereby the stationary cap member 11 may be snapped onto the container a by forcing the protrusions 29 beneath the mounting bead b. The circumferential wall 15, being of a plastic material such as polyethylene, will yield sufficiently under the "snap-on" force to permit the protrusions 29 to pass over the mounting bead b and then spring back to their original positions thereby to rigidly attach the cap member 11 to the container a. Preferably the undercut protrusions
29 are positioned diametrically opposite one another to provide the most secure attachment.

The openings 31 and 33 of the spout housing member 18 will now be described in more detail. The front aperture 31 is a rectangular opening designed to receive a spout nozzle to be described hereinafter. The rear opening 33 is formed in the tank shell plan and profile (and in path 30, respectively) can be generally described as trapezoidal. It extends downward through the rear wall 27 to substantially the level of the intermediate top portion 19. At this level the opening 33 is bounded by a horizontal upper edge of the rear wall 27, which is hereinafter referred to as the discharge spout opening. A small circular opening 46 is located diametrically opposite the front opening 31 such that a radially-extending discharge spout member, to be described hereinafter, may project through the front and rear openings 31, 33 as shown in the drawings.

The cap member 11 also is equipped with a safetying slot 37, best seen in FIG. 5, which is provided in the rear wall 27 and extends upward from the base portion 17 to a point beneath the latch seat portion 35. The width of the safetying slot 37 bears a specific relationship to the width of various portions of a safetying tie, to be described hereinafter.

The other member shown in FIG. 1 is referred to generally as the discharge spout member 39 formed of a tough, resiliently yieldable plastic material. It has a forwardly extending nozzle portion 41 extending through the front wall aperture 31 and including a tubular passageway 43 which extends radially inward. A hollow hub-like portion 46 at the inner end of the tubular passageway 43 extends downward in registration with, and is adapted to sealingly engage the discharge tip g of the hollow stem valve d.

Aft of the hub-like portion 46 extends a ribbed, tapering beam-like part 50 of a finger-actuator portion generally designated 51, mounting a trapezoidal finger pad part 48 which extends aft of the beam-like part 50 and projects upward through the second aperture. At the outer end of the beam-like part 50, the finger pad part 48 presents in effect a thinned, bendable cross-section 49 of the finger actuator portion 47.

The rearwardly extending projection of the finger pad part 48 if referred to as the projection 51; it extends substantially horizontally and from it depends a flat tangential latch tab 53 at a point radially outward of the tangential recess wall 27. Not only does the pad 48 provide an overhang for applying an upward force necessary to release the latch prior to the operation of the finger actuator portion 47, but it also facilitates the insertion of a safetying tie into the safetying slot 37 in the manner hereinafter described.

The thinned cross-section 49 of the finger actuator portion 47 lessens its structural resistance to bending. Thus projection 51 may be readily deflected by a force much less than that which would be required if the entire finger actuator 47 had to be bent.

Molded integrally with the finger actuator portion 47 is the downwardly-extending latch tab 53 which is positioned radially outward of the thinned cross-section 49. This positioning allows the latch tab 53 to deflect in concert with the deflection of the finger actuator portion 47 about its thinned cross-section; that is, the tab can deflect upward and inward toward the latch seat 35. A generally V-shaped notch 54 is provided in the lower end of the latch tab 53 to permit engagement of the latching seat 35 therewith. The latch assembly thus formed requires a force to be exerted upwardly on the finger actuator portion 47 to permit tab 53 to be deflected outward of the seat 35. Before the finger pad part 48 can be depressed to actuate the valve d.

Also molded as a part of the discharge spout 39 is a safetying tie 57, which utilizes the advantages of the bendable, somewhat tough, resilient plastic material. The safetying tie 57 takes the general configuration of a T-shaped thong having an elongated portion 58 which extends from the projection 51 of the finger actuator portion 47 and terminates in an enlarged end. As molded and in its un-bent condition, the safetying tie 57 extends in the same direction as the finger actuator portion 47, as shown in FIGS. 2-5. The width of the elongated portion 58 is chosen such that it is capable of being inserted in the safetying slot 37. A side view 1750, 2050 and a top view 1751, 2051 of the elongated portion 58 is shown such that when so inserted, the safetying tie 57 is lodged within the cap member 11. It should be understood that the elongated portion 58 need not be of a constant width throughout but may taper from the width of the finger actuator portion 47 to a width which is less than the width of the safetying tie 57.

The latch engagement of the latch tab 53 and the latch seat 35 is provided by the insertion of the tab-engaging seat 55 within the V-shaped notch 54 formed by parallel, forward and aft notch walls 71 and 72 of the latch tab 53. Latch seat side supports 61 buttress notch wall 71. The height of the tab engagement seat 55, the depth of the V-shaped notch, and the length of the safetying tie 57 are chosen such that the forward notch wall 71 cannot be raised above seat 55 as long as the safetying tie 57 is drawn taut and secured within the safetying slot 37 as shown in FIG. 1.

By providing the thinned cross-section 49 of the finger actuator 47 and locating the latch tab 53 radially outward of the latch seat 35, easy engagement and disengagement of the latch tab 53 is afforded. In the absence of such an arrangement, much effort would be required to insert the V-shaped notch over the tab-engaging seat 55. Furthermore, the length of the safetying tie 57 must not be allowed to be greater than a certain predetermined length, that is, not so slack, when its end is lodged in the safetying slot 37, as to allow disengagement of the tab 53 from seat 35. Therefore, it is desirable to mold it shorter than would permit easy insertion in the safetying slot 37. The rearward projecting length to the finger actuator portion 47 allows, assembly, a degree of resilient bending which permits the enlarged end 58 of safetying tie 37, passed beneath the base portion 17, to become tightly lodged within the rear wall 27, as hereinbefore mentioned.

During assembly of the nozzle actuator, the latch tab 53 is positioned to receive the tab-engaging seat 55 in its V-shaped notch 54. This may be done by flexing the finger actuator on the discharge spout 39 as this project a thinned cross-section 49 whereby the latch tab 53 is carried upward and inwardly until its notch is positioned over the tab-engaging seat 55. Then bending the safetying tie 57 down and inward so that its enlarged end 59 passes below the base portion 17, and the elongated tie portion 57 is drawn taut through safetying slot 37. Alternately, said tie may be engaged within the slot 37 and a bending force applied to carry the tab 53 upward, over and into the seat 55. The enlarged end 59, so lodged within the rear wall 27, prevents upward movement of the finger actuator portion 47 which might disengage the latch tab 53 from the tab-engaging seat 55.

After the contents have been inserted into the container and the gas entered therein, the fully assembled and safetied actuator is forced onto the container a until the undercut projections 29 secures it firmly thereto. The actuator hub 46 engages the discharge tip g of the valve d. Before the tubular stemmed valve d can be actuated by the finger actuator portion 47, the safetying tie 57 must be severed by the user and tab 53 raised and disengaged from seat 55. Until such severance, it is not possible to inadvertently actuate the valve to pierce the contents of the container a.

Upon severing the safetying tie 57, the finger actuator 47 may be released for actuation by lifting it up to disengage tab 53 and the seat 55. The tab 53, being positioned radially outward of seat 35, will then deflect outward of the wall 27 so as to permit downward and tilting actuation of the actuator 47. The user then presses
his finger on the pressure applying area 51 of the finger pad part 48, causing the hub 46 to move to unseat the valve 4. This permits the container contents to flow around the head e, through the stem ports f, into the hub portion 46 and out the forward nozzle 41.

The present locking actuator construction for an aerosol dispenser therefore provides a latch assembly which facilitates easy engagement and disengagement of a finger actuator, which in its engaged condition is secured by a safetying device to prevent dispenser sampling and inadvertent actuation. In this latter function, it makes unnecessary the protective covering domes which have been conventionally used heretofore.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. For example, the latching tab could be positioned directly above or inward of seat 35 and inclined radially outward in its disengaged condition so long as some suitable bendable portion is provided to cooperate with it. It is therefore to be understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

I claim:
1. Locking actuator construction for dispensers of the type having a valve mounted in a dispenser container, comprising
   a radially extending discharge spout part having a rearward, downwardly-extendable finger actuator portion, a forward nozzle outlet portion and a latching tab extending downwardly from the finger actuator portion, together with
   a cap part adapted for snap-on engagement with the dispenser container, said cap part having a first aperture through which said nozzle outlet portion projects, a second aperture through which said finger actuator portion projects and a tab-engaging seat on the portion of said cap part diametrically opposite said first aperture.

said actuator construction being characterized in that said latching tab depends from said finger actuator portion and terminates in an end which is registrable with said tab-engaging seat on the cap part, and in that

said finger actuator portion has a thinned bendable cross-section portion radially inward of the latching tab, whereby to permit radial deflection of the latching tab for engaging the tab-engaging seat on the cap part.

2. The locking actuator construction of claim 1, further characterized in that
   said latching tab depends from said finger actuator portion at a point radially outward of the tab-engaging seat of the cap part, and
   said cap part has a safetying slot extending upwardly from the base thereof, and in that
   said finger actuator portion has a tough resilient safetying tie part having an elongated portion extending to and terminating in an enlarged end portion,
   said elongated portion of said safetying tie part being of a width sufficiently narrow to permit insertion in said safetying slot and said end portion being of sufficient width to prevent removal of said tie part therethrough.

3. The locking actuator construction of claim 2, further characterized in that said finger actuator part being of flexible plastic material and projecting beyond said cap part to facilitate the insertion of said enlarged end of said safetying tie part into said safetying slot.

4. Locking actuator construction for dispensers including a container mounting a discharge valve comprising a circumferential wall part having a base portion including

means formed integrally for securement thereof to the container, and

integral latch seat means above the base portion, further comprising an actuator part having

locking means formed integrally for engaging said latch seat means to prevent movement of the actuator part in the direction for opening the valve, and including

integral safetying tie means extending from the actuator part to terminate in an end portion, there being means formed integral with said circumferential wall part for receiving said end portion of said safetying tie means, whereby the mounting of the circumferential wall part to the container secures the safetying tie means within said receiving means to thereby prevent disengagement of said latching means and said latch seat.

5. The locking actuator construction of claim 4, wherein

said latching means is formed radially outward from said latch seat means, said latching means being deflectable radially inward to engage said latch seat means whereby movement of the actuator in the direction for opening the valve is prevented.

6. The locking actuator construction of claim 5, wherein

said safetying tie means has an elongated portion terminating in an enlarged end, and

said receiving means being a slot in said circumferential wall part, said slot extending upwardly from the base portion thereof and terminating beneath the latch seat means, and being of a width sufficient to receive said elongated portion and less than the width of said enlarged end of said tie means.

7. The locking actuator construction of claim 6, wherein

said actuator part is of tough, resilient bendable material

and its integral safetying tie means extends horizontally and radially outward in unbent condition,

said safetying tie being bendable downwardly and radially inward to permit said enlarged end thereof to pass beneath the base portion of said circumferential wall part whereby said elongated portion is drawn taut through said slot and its enlarged end is lodged radially inward of said slot.

8. Locking actuator construction for dispensers of the type having a downward opening valve, comprising
   a radially extending discharge spout part having a downwardly-extendable finger actuator portion and a nozzle outlet portion, and
   a cap part having a lower rim and including thereabove a first aperture through which said nozzle outlet portion projects and a second aperture through which said finger actuator portion projects, together with

latch means including a latch tab extending downwardly from the finger actuator portion of the spout part, and a tab-engaging latch portion on the cap part thereon.

said locking actuator construction being characterized in having a tough resilient elongated safetying tie extending from said finger actuator portion to and terminating in an enlarged end portion; and in that

the cap part has a safetying slot extending upward from said lower rim, said slot being of a width sufficient to receive said elongated safetying tie and less than said enlarged end portion.

9. Locking actuator construction for an aerosol dispenser of the type having a downwardly-opening valve terminating at its upward end in a tubular stem, comprising
   a discharge spout part having a radially extending tubular wall identifying a passageway therethrough, said tubular wall having
a hub-like inlet portion in which such upward stem end is received and
a nozzle outlet portion at the radially outer end of said passageway,
said discharge spout part further having a downwardly-operable finger actuator portion and an integral latch member depending from said finger actuator portion, a tough resilient thong portion including an elongated tie continuing from said finger actuator portion and extending to and terminating in an enlarged end, in combination with a circumferential wall part extending upwardly from a lower rim and having a first aperture through which the nozzle outlet portion projects and a second aperture through which the finger actuator portion projects, the wall part having a latch seat portion diametrically positioned from said nozzle outlet aperture, and further having therebeneath a safetying slot extending upwardly from said lower rim to an intermediate height, said slot being of a width sufficient to receive said elongated tie and less than said enlarged end portion.

10. The locking actuator construction of claim 9, wherein the length of said tough resilient thong is such as to prevent release of said latch member from said latch seat while said thong is secured in said safetying slot.

11. The locking actuator construction of claim 10, wherein said finger actuator portion is of flexible plastic material and extends beyond said circumferential wall part, whereby its deflection facilitates the insertion of said thong portion into said safetying slot.

References Cited by the Examiner
UNITED STATES PATENTS
3,075,709 1/63 Green 222—394 X

LOUIS J. DEMBO, Primary Examiner.